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**DATE:** March 10, 2005

**TO:** EXAMINER: CHANG, E. 703-305-3416  
(ADDRESSEE'S NAME) (EXTENSION)  
ART UNIT 2637 703-872-9306  
(LOCATION) (FAX NUMBER)

**FROM:** MATTHEW C. LOPPNOW (847) 523-2585  
(SENDER'S NAME) (EXTENSION)

**RE:** APPLICATION NO. 09/590,594 - APPEAL BRIEF

TOTAL NUMBER OF PAGE(S) 26 (INCLUDING THIS PAGE)

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Signature

Matthew C. Appnow

Date March 10, 2005

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

5 APPLICANT: KOSMACH et al.

EXAMINER: Chang, E.

SERIAL NO.: 09/590,594

GROUP: 2637

10 FILED: June 9, 2000

CASE NO.: PF02072NA

ENTITLED: METHOD AND APPARATUS FOR ASSIGNING BIT METRICS FOR SOFT  
DECISION DECODING

15

Motorola, Inc.  
Intellectual Property Department  
600 North U.S. Highway 45  
Libertyville, IL 60048

20

APPEAL BRIEF UNDER 37 C.F.R. § 1.192(c)

25

MS Appeal Brief - Patents  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

30

Further to the Notice of Appeal filed on January 12, 2005, Applicant submits the  
present Appeal Brief.

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**I. REAL PARTY IN INTEREST**

The real party in interest is, Motorola, Inc.

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**II. RELATED APPEALS AND INTERFERENCES**

There are no related appeals or interferences.

10

**III. STATUS OF CLAIMS**

Claims 1-25 are pending. Claims 1-25 are rejected and are the subject of the present appeal.

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**IV. STATUS OF AMENDMENTS**

No amendments were filed subsequent to final rejection.

**V. SUMMARY OF INVENTION**

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The inventions are drawn generally to a method and apparatus for assigning bit metrics for algebraic soft decision decoding (page 1, lines 4-8). A receiver (10) can be used to receive and decode messages. The receiver can include a detector (20) that can be adapted to detect transmitted symbols and a decoder (30) that can perform error correction and decoding functions (Fig. 1 and page 6, lines 15-20). In one embodiment, the detector can include a demodulator (40) adapted to generate inphase (I) and quadrature (Q) signal components. The magnitudes of inphase and quadrature filters can be squared and added to generate energy values for each of the possible symbols  $jk = 00, 01, 10, 11$ . The decoder can receive the output energy measurement from the detector and generate bit metrics for use in determining the least reliable bits (Fig. 2 and page 7, lines 10-19). In another embodiment, the detector can be a discrimination detector (Fig. 3 and page 8, lines 12-13).

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## VI. ISSUES

Whether claims 1, 13, and 25 are patentable under 35 U.S.C. § 103 over Yamao et al. (U.S. Patent No. 6,351,498 B1) and Iwamura (U.S. Patent No. 5,742,620).

5

## VII. GROUPING OF CLAIMS

Claims 1, 13 and 25 do not stand or fall together regarding the rejection thereof under 35 U.S.C. § 103.

10

## VIII. ARGUMENT

### Claim Limitations At Issue

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In Claim 1, the limitations at issue are italicized below:

1. A receiver, comprising:

a detector adapted to demodulate a received signal to generate a received word, the received word including a plurality of symbols, each symbol containing data associated with a first phase and data associated with a second phase, the detector being further adapted to generate a plurality of energy values relating each received symbol to one of a plurality of potential symbols; and

20

a decoder adapted to generate *a first set of bit metrics based on the energy values in response to the receiver being assigned to the first phase and a second set of bit metrics based on the energy values in response to the receiver being assigned to the second phase*, the decoder being further adapted to *identify the least reliable bits in the received word based on one of the first and second sets of bit metrics.*

25

### Examiner's Allegation

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Claim 1 was rejected under 35 U.S.C. § 103 over Yamao et al. (U.S. Patent No. 6,351,498 B1) and Iwamura (U.S. Patent No. 5,742,620).

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Applicants' Argument

Neither Yamao et al. nor Iwamura disclose generating a first set of bit metrics based on the energy values in response to the receiver being assigned to the first phase and a second set of bit metrics based on the energy values in response to the receiver being assigned to the second phase and identifying the least reliable bits in the received word based on one of the first and second sets of bit metrics, as recited in independent claim 1. Furthermore, none of the Office Actions have provided proper motivation to combine the references.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the reference or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art references, when combined, must teach or suggest all of the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure (MPEP 2142). The prior art must suggest the desirability of the claimed invention (MPEP 2143.01).

Yamao et al. discloses a digital modulation and demodulation scheme for radio communications involving fading (col. 3, lines 9-15). The first Office Action alleged generating a first set of bit metrics based on the energy values in response to the receiver being assigned to the first phase and a second set of bit metrics based on the energy values in response to the receiver being assigned to the second phase is disclosed at Fig. 13 and col. 8, lines 28-60. Applicants disagree. Lines 28-60 expressly state "after received signals are filtered through band-pass filters BPF1 to BPF4 having central frequencies  $f_1$ ,  $f_2$ ,  $f_3$ , and  $f_4$  respectively, four detector outputs are obtained and then 2 bits corresponding to a frequency for which the largest detector output is obtained are outputted as  $h_1$  and  $h_2$ )." There is nothing present in the quoted portion of the cited section, or any of the remaining portions of the cited section, of doing anything in response to a receiver being assigned to a phase. The cited section only discusses band-pass filtering around central frequencies and outputting 2 bits corresponding to a frequency. None of the cited section nor the remaining sections of Yamao et al. disclose generating a first set of bit metrics based on the energy values in response to the receiver being assigned to the first phase and a second set of bit metrics based on the energy values in response to the receiver being assigned to the second phase.

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Iwamura fails to make up for the deficiencies of Yamao et al. In particular, Iwamura discloses a Generalized Minimum Distance (GMD) decoding method and apparatus (col. 5, lines 12-25). Iwamura does not disclose generating a first set of bit metrics based on the energy values in response to the receiver being assigned to the first phase and a second set of bit metrics based on the energy values in response to the receiver being assigned to the second phase. In fact, Iwamura has absolutely no disclosure of any relationship between a GMD decoding apparatus and phase whatsoever. Accordingly, Iwamura fails to make up for the deficiencies of Yamao et al.

Thus, neither Yamao et al. nor Iwamura disclose generating a first set of bit metrics based on the energy values in response to the receiver being assigned to the first phase and a second set of bit metrics based on the energy values in response to the receiver being assigned to the second phase and identifying the least reliable bits in the received word based on one of the first and second sets of bit metrics, as recited in independent claim 1.

Furthermore, the Office Actions have not provided proper motivation for combining the references. The first Office Action alleges motivation is based on "to have a more efficient decoding with less amount of parallel processing ability" and cites col. 5, lines 10-25 of Iwamura to support this allegation. However, this allegation does not provide motivation to combine the references. In particular, lines 10-25 only disclose the benefits of the disclosed GMD decoding method over a conventional GMD decoding method. Yet, Yamao et al. does not disclose the use of a GMD decoding method. Because, the only disclosed benefits of Iwamura relate to a GMD decoding method and because Yamao et al. does not utilize a GMD decoding method, there is no motivation to combine the teachings of Iwamura with Yamao et al. Thus, the Office Action has failed to establish a *prima facie* case of obviousness.

Applicants recognize that one reading the claimed invention may begin to recognize numerous benefits that suddenly become apparent only after reading the claimed invention. The more the exact words of the claims are read, the more one can realize the benefits only became apparent after reading Applicants' teachings. Upon reaching this realization, it is easy to notice that there is absolutely no evidence of motivation in the prior art and such evidence has not been provided by any of the Office Actions. Yet, such motivation is required for a proper rejection under 35 USC § 103. Once one notices there is no evidence of motivation in the prior art, one can understand that the Office Actions have applied impermissible hindsight in attempting to combine the references.

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The final Office Action fails to make up for the deficiencies of the rejection in the first Office Action. In particular, in the Response to Arguments section, the final Office Action went into great detail describing the transmitter of Yamao et al. The final Office Action then only alleged the receiver performs the claimed features without providing any foundation for such allegations in the cited reference. The final Office Action seemed to imply that since the transmitter performs certain functions, the receiver allegedly performs the claimed function. Unfortunately, the final Office Action did not provide a basis for this implication. In particular, the final Office Action did not provide a basis for a receiver performing the specific features of the claimed invention. More particularly, in the first response, Applicants asserted that there is no disclosure in Yamao et al. of generating a first set of bit metrics based on the energy values in response to the receiver being assigned to the first phase and a second set of bit metrics based on the energy values in response to the receiver being assigned to the second phase. However, the final Office Action still did not provide any foundation in the reference of the claimed feature. Because no such foundation existed, Applicants requested withdrawal of the rejection.

Additionally, Applicants previously asserted Iwamura has no disclosure of any relationship between a GMD decoding apparatus and phase. In the Response to Arguments section, the final Office Action alleged Iwamura teaches bit metrics in GMS decoding. Thus, the Office Action appeared to concede Iwamura has no disclosure of any relationship between a GMD decoding apparatus and phase.

Furthermore, Applicants asserted the Office Action did not provide proper motivation for combining the references. Unfortunately, the final Office Action still did not provide proper motivation for combining the references. In particular, the final Office Action only cited sections of each reference that discuss the operation of the references. However, the final Office Action did not provide any basis for actually combining the references. The final Office Action only made a conclusory remark of: "The motivation and benefit are obvious." However, this is not a proper basis for motivation. In particular, there must be some suggestion or motivation, either in the reference or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings (MPEP 2142). The allegations of the final Office Action only amounted to a circular allegation of the combination being obvious because it is obvious. In fact, the final Office Action did not even attempt to address Applicants' specific assertions of the lack of



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motivation. Thus, the final Office Action still did not provide proper motivation for combining the references.

The Advisory Action appears to admit the deficiencies of the previous Office Actions because it introduced new interpretations of the cited references. In particular, the Advisory  
5 Action alleged new, elaborate interpretations of two different embodiments of Yamao et al. in an attempt to fix the deficiencies of the previous Office Actions. Unfortunately, Applicants were not provided the opportunity to respond to these new interpretations during normal prosecution. Furthermore, the interpretations are so convoluted, Applicants assert they do not remedy the deficiencies of the previous Office Actions.

10 In particular, among other deficiencies, the new interpretations still do not disclose generating a first set of bit metrics based on the energy values in response to a receiver being assigned a first phase. For example, the Advisory Action alleges "the output of the decoder 4-1 is a bit metrics wherein the (a1, a2) is the bit metrics." However, this is not taught by Yamao et al. More particularly, Yamao et al. only states "The four sequences of 2 bits data  
15 outputted from the M-ary decoders 4-1 to 4-4 are then recomposed into the original 8 bits data (i) (at a point (i) indicated in Fig. 11) by the composition unit 8 using the inverse operations of what was applied at the transmitting side." Yamao et al. does not state that it generates a first set of bit metrics based on the energy values in response to a receiver being assigned a first phase.

20 Additionally, the Advisory Action appears to concede that Yamao et al. does not state that it generates a first set of bit metrics based on the energy values in response to a receiver being assigned a first phase because the Advisory Action goes on to allege "it is well known in the art that the first and second sets of sequence from the energy values of the envelop detector (as shown in Fig. 14) can be represented by bit metrics in math form." Unfortunately, this  
25 allegation is improper for at least two reasons. First, it is a new grounds of rejection that was not introduced in any previous Office Action, and Applicants have not been given the opportunity to traverse this allegation of what was well known. Thus, Applicants traverse this allegation in accordance with MPEP §2144.04. Second, the fact that first and second sets of sequence can be represented by bit metrics does provide motivation for doing so. Therefore,  
30 the allegation of "it is well known in the art that the first and second sets of sequence from the energy values of the envelop detector (as shown in Fig. 14) can be represented by bit metrics in math form" is improper.

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Accordingly, neither Yamao et al. nor Iwamura disclose generating a first set of bit metrics based on the energy values in response to the receiver being assigned to the first phase and a second set of bit metrics based on the energy values in response to the receiver being assigned to the second phase as recited in independent claim 1. Furthermore, the Office  
5 Actions have not provided proper motivation to combine the references.

#### Claim Limitations At Issue

In Claim 13, the limitations at issue are italicized below:

10 13. A method for assigning bit metrics for algebraic decoding in a receiver,  
comprising:  
demodulating a received signal to generate a received word, the received word  
including a plurality of symbols, each symbol containing data associated with a first phase and  
15 data associated with a second phase;  
generating a plurality of energy values relating each received symbol to one of  
a plurality of potential symbols;  
generating *a first set of bit metrics based on the energy values in response to  
the receiver being assigned to the first phase and a second set of bit metrics based on the  
20 energy values in response to the receiver being assigned to the second phase; and*  
*designating the least reliable bits in the received word based on one of the first  
and second sets of bit metrics.*

#### Examiner's Allegation

25 Claim 13 was rejected under 35 U.S.C. § 103 over Yamao et al. (U.S. Patent No. 6,351,498 B1) and Iwamura (U.S. Patent No. 5,742,620).

#### Applicants' Argument

30 Neither Yamao et al. nor Iwamura disclose generating a first set of bit metrics based on the energy values in response to the receiver being assigned to the first phase and a second set of bit metrics based on the energy values in response to the receiver being assigned to the

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second phase and designating the least reliable bits in the received word based on one of the first and second sets of bit metrics, as recited in independent claim 13. Furthermore, none of the Office Actions have provided proper motivation to combine the references.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the reference or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art references, when combined, must teach or suggest all of the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure (MPEP 2142). The prior art must suggest the desirability of the claimed invention (MPEP 2143.01).

Yamao et al. discloses a digital modulation and demodulation scheme for radio communications involving fading (col. 3, lines 9-15). The first Office Action alleged generating a first set of bit metrics based on the energy values in response to the receiver being assigned to the first phase and a second set of bit metrics based on the energy values in response to the receiver being assigned to the second phase is disclosed at Fig. 13 and col. 8, lines 28-60. Applicants disagree. Lines 28-60 expressly state "after received signals are filtered through band-pass filters BPF1 to BPF4 having central frequencies f1, f2, f3, and f4 respectively, four detector outputs are obtained and then 2 bits corresponding to a frequency for which the largest detector output is obtained are outputted as h1 and h2)." There is nothing present in the quoted portion of the cited section, or any of the remaining portions of the cited section, of doing anything in response to a receiver being assigned to a phase. The cited section only discusses band-pass filtering around central frequencies and outputting 2 bits corresponding to a frequency. None of the cited section nor the remaining sections of Yamao et al. disclose generating a first set of bit metrics based on the energy values in response to the receiver being assigned to the first phase and a second set of bit metrics based on the energy values in response to the receiver being assigned to the second phase.

Iwamura fails to make up for the deficiencies of Yamao et al. In particular, Iwamura discloses a Generalized Minimum Distance (GMD) decoding method and apparatus (col. 5, lines 12-25). Iwamura does not disclose generating a first set of bit metrics based on the energy values in response to the receiver being assigned to the first phase and a second set of bit metrics based on the energy values in response to the receiver being assigned to the second phase. In fact, Iwamura has absolutely no disclosure of any relationship between a GMD

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decoding apparatus and phase whatsoever. Accordingly, Iwamura fails to make up for the deficiencies of Yamao et al.

Thus, neither Yamao et al. nor Iwamura disclose generating a first set of bit metrics based on the energy values in response to the receiver being assigned to the first phase and a second set of bit metrics based on the energy values in response to the receiver being assigned to the second phase and identifying the least reliable bits in the received word based on one of the first and second sets of bit metrics, as recited in independent claim 1.

Furthermore, the Office Actions have not provided proper motivation for combining the references. The first Office Action alleges motivation is based on "to have a more efficient decoding with less amount of parallel processing ability" and cites col. 5, lines 10-25 of Iwamura to support this allegation. However, this allegation does not provide motivation to combine the references. In particular, lines 10-25 only disclose the benefits of the disclosed GMD decoding method over a conventional GMD decoding method. Yet, Yamao et al. does not disclose the use of a GMD decoding method. Because, the only disclosed benefits of Iwamura relate to a GMD decoding method and because Yamao et al. does not utilize a GMD decoding method, there is no motivation to combine the teachings of Iwamura with Yamao et al. Thus, the Office Action has failed to establish a *prima facie* case of obviousness.

Applicants recognize that one reading the claimed invention may begin to recognize numerous benefits that suddenly become apparent only after reading the claimed invention. The more the exact words of the claims are read, the more one can realize the benefits only became apparent after reading Applicants' teachings. Upon reaching this realization, it is easy to notice that there is absolutely no evidence of motivation in the prior art and such evidence has not been provided by any of the Office Actions. Yet, such motivation is required for a proper rejection under 35 USC § 103. Once one notices there is no evidence of motivation in the prior art, one can understand that the Office Actions have applied impermissible hindsight in attempting to combine the references.

The final Office Action fails to make up for the deficiencies of the rejection in the first Office Action. In particular, in the Response to Arguments section, the final Office Action went into great detail describing the transmitter of Yamao et al. The final Office Action then only alleged the receiver performs the claimed features without providing any foundation for such allegations in the cited reference. The final Office Action seemed to imply that since the transmitter performs certain functions, the receiver allegedly performs the claimed function. Unfortunately, the final Office Action did not provide a basis for this implication. In

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particular, the final Office Action did not provide a basis for a receiver performing the specific features of the claimed invention. More particularly, in the first response, Applicants asserted that there is no disclosure in Yamao et al. of generating a first set of bit metrics based on the energy values in response to the receiver being assigned to the first phase and a second set of bit metrics based on the energy values in response to the receiver being assigned to the second phase. However, the final Office Action still did not provide any foundation in the reference of the claimed feature. Because no such foundation existed, Applicants requested withdrawal of the rejection.

Additionally, Applicants previously asserted Iwamura has no disclosure of any relationship between a GMD decoding apparatus and phase. In the Response to Arguments section, the final Office Action alleged Iwamura teaches bit metrics in GMS decoding. Thus, the Office Action appeared to concede Iwamura has no disclosure of any relationship between a GMD decoding apparatus and phase.

Furthermore, Applicants asserted the Office Action did not provide proper motivation for combining the references. Unfortunately, the final Office Action still did not provide proper motivation for combining the references. In particular, the final Office Action only cited sections of each reference that discuss the operation of the references. However, the final Office Action did not provide any basis for actually combining the references. The final Office Action only made a conclusory remark of: "The motivation and benefit are obvious." However, this is not a proper basis for motivation. In particular, there must be some suggestion or motivation, either in the reference or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings (MPEP 2142). The allegations of the final Office Action only amounted to a circular allegation of the combination being obvious because it is obvious. In fact, the final Office Action did not even attempt to address Applicants' specific assertions of the lack of motivation. Thus, the final Office Action still did not provide proper motivation for combining the references.

The Advisory Action appears to admit the deficiencies of the previous Office Actions because it introduced new interpretations of the cited references. In particular, the Advisory Action alleged new, elaborate interpretations of two different embodiments of Yamao et al. in an attempt to fix the deficiencies of the previous Office Actions. Unfortunately, Applicants were not provided the opportunity to respond to these new interpretations during normal

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prosecution. Furthermore, the interpretations are so convoluted, Applicants assert they do not remedy the deficiencies of the previous Office Actions.

In particular, among other deficiencies, the new interpretations still do not disclose generating a first set of bit metrics based on the energy values in response to a receiver being assigned a first phase. For example, the Advisory Action alleges "the output of the decoder 4-1 is a bit metrics wherein the (a1, a2) is the bit metrics." However, this is not taught by Yamao et al. More particularly, Yamao et al. only states "The four sequences of 2 bits data outputted from the M-ary decoders 4-1 to 4-4 are then recomposed into the original 8 bits data (i) (at a point (i) indicated in Fig. 11) by the composition unit 8 using the inverse operations of what was applied at the transmitting side." Yamao et al. does not state that it generates a first set of bit metrics based on the energy values in response to a receiver being assigned a first phase.

Additionally, the Advisory Action appears to concede that Yamao et al. does not state that it generates a first set of bit metrics based on the energy values in response to a receiver being assigned a first phase because the Advisory Action goes on to allege "it is well known in the art that the first and second sets of sequence from the energy values of the envelop detector (as shown in Fig. 14) can be represented by bit metrics in math form." Unfortunately, this allegation is improper for at least two reasons. First, it is a new grounds of rejection that was not introduced in any previous Office Action, and Applicants have not been given the opportunity to traverse this allegation of what was well known. Thus, Applicants traverse this allegation in accordance with MPEP §2144.04. Second, the fact that first and second sets of sequence can be represented by bit metrics does provide motivation for doing so. Therefore, the allegation of "it is well known in the art that the first and second sets of sequence from the energy values of the envelop detector (as shown in Fig. 14) can be represented by bit metrics in math form" is improper.

Accordingly, neither Yamao et al. nor Iwamura disclose generating a first set of bit metrics based on the energy values in response to the receiver being assigned to the first phase and a second set of bit metrics based on the energy values in response to the receiver being assigned to the second phase and designating the least reliable bits in the received word based on one of the first and second sets of bit metrics, as recited in independent claim 13. Furthermore, none of the Office Actions have provided proper motivation to combine the references.

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### Claim Limitations At Issue

In Claim 25, the limitations at issue are italicized below:

- 5           25. A receiver, comprising:
- means for demodulating a received signal to generate a received word, the  
received word including a plurality of symbols, each symbol containing data associated with a  
first phase and data associated with a second phase;
- means for generating a plurality of energy values relating each received symbol  
10       to one of a plurality of potential symbols;
- means for generating a first set of bit metrics based on the energy values in  
response to the receiver being assigned to the first phase and a second set of bit metrics based  
on the energy values in response to the receiver being assigned to the second phase; and*
- means for designating the least reliable bits in the received word based on one*  
15       *of the first and second sets of bit metrics.*

### Examiner's Allegation

20           Claim 25 was rejected under 35 U.S.C. § 103 over Yamao et al. (U.S. Patent No.  
6,351,498 B1) and Iwamura (U.S. Patent No. 5,742,620).

### Applicants' Argument

25           Neither Yamao et al. nor Iwamura disclose a means for generating a first set of bit  
metrics based on the energy values in response to the receiver being assigned to the first phase  
and a second set of bit metrics based on the energy values in response to the receiver being  
assigned to the second phase and means for designating the least reliable bits in the received  
word based on one of the first and second sets of bit metrics, as recited in independent claim  
25. Furthermore, none of the Office Actions have provided proper motivation to combine the  
30       references.

              To establish a *prima facie* case of obviousness, three basic criteria must be met. First,  
there must be some suggestion or motivation, either in the reference or in the knowledge  
generally available to one of ordinary skill in the art, to modify the reference or to combine the

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reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art references, when combined, must teach or suggest all of the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure (MPEP 2142). The prior art must suggest the desirability of the claimed invention (MPEP 2143.01).

Yamao et al. discloses a digital modulation and demodulation scheme for radio communications involving fading (col. 3, lines 9-15). The first Office Action alleged generating a first set of bit metrics based on the energy values in response to the receiver being assigned to the first phase and a second set of bit metrics based on the energy values in response to the receiver being assigned to the second phase is disclosed at Fig. 13 and col. 8, lines 28-60. Applicants disagree. Lines 28-60 expressly state "after received signals are filtered through band-pass filters BPF1 to BPF4 having central frequencies f1, f2, f3, and f4 respectively, four detector outputs are obtained and then 2 bits corresponding to a frequency for which the largest detector output is obtained are outputted as h1 and h2)." There is nothing present in the quoted portion of the cited section, or any of the remaining portions of the cited section, of doing anything in response to a receiver being assigned to a phase. The cited section only discusses band-pass filtering around central frequencies and outputting 2 bits corresponding to a frequency. None of the cited section nor the remaining sections of Yamao et al. disclose generating a first set of bit metrics based on the energy values in response to the receiver being assigned to the first phase and a second set of bit metrics based on the energy values in response to the receiver being assigned to the second phase.

Iwamura fails to make up for the deficiencies of Yamao et al. In particular, Iwamura discloses a Generalized Minimum Distance (GMD) decoding method and apparatus (col. 5, lines 12-25). Iwamura does not disclose generating a first set of bit metrics based on the energy values in response to the receiver being assigned to the first phase and a second set of bit metrics based on the energy values in response to the receiver being assigned to the second phase. In fact, Iwamura has absolutely no disclosure of any relationship between a GMD decoding apparatus and phase whatsoever. Accordingly, Iwamura fails to make up for the deficiencies of Yamao et al.

Thus, neither Yamao et al. nor Iwamura disclose generating a first set of bit metrics based on the energy values in response to the receiver being assigned to the first phase and a second set of bit metrics based on the energy values in response to the receiver being assigned



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to the second phase and identifying the least reliable bits in the received word based on one of the first and second sets of bit metrics, as recited in independent claim 1.

Furthermore, the Office Actions have not provided proper motivation for combining the references. The first Office Action alleges motivation is based on "to have a more efficient decoding with less amount of parallel processing ability" and cites col. 5, lines 10-25 of Iwamura to support this allegation. However, this allegation does not provide motivation to combine the references. In particular, lines 10-25 only disclose the benefits of the disclosed GMD decoding method over a conventional GMD decoding method. Yet, Yamao et al. does not disclose the use of a GMD decoding method. Because, the only disclosed benefits of Iwamura relate to a GMD decoding method and because Yamao et al. does not utilize a GMD decoding method, there is no motivation to combine the teachings of Iwamura with Yamao et al. Thus, the Office Action has failed to establish a *prima facie* case of obviousness.

Applicants recognize that one reading the claimed invention may begin to recognize numerous benefits that suddenly become apparent only after reading the claimed invention. The more the exact words of the claims are read, the more one can realize the benefits only became apparent after reading Applicants' teachings. Upon reaching this realization, it is easy to notice that there is absolutely no evidence of motivation in the prior art and such evidence has not been provided by any of the Office Actions. Yet, such motivation is required for a proper rejection under 35 USC § 103. Once one notices there is no evidence of motivation in the prior art, one can understand that the Office Actions have applied impermissible hindsight in attempting to combine the references.

The final Office Action fails to make up for the deficiencies of the rejection in the first Office Action. In particular, in the Response to Arguments section, the final Office Action went into great detail describing the transmitter of Yamao et al. The final Office Action then only alleged the receiver performs the claimed features without providing any foundation for such allegations in the cited reference. The final Office Action seemed to imply that since the transmitter performs certain functions, the receiver allegedly performs the claimed function. Unfortunately, the final Office Action did not provide a basis for this implication. In particular, the final Office Action did not provide a basis for a receiver performing the specific features of the claimed invention. More particularly, in the first response, Applicants asserted that there is no disclosure in Yamao et al. of generating a first set of bit metrics based on the energy values in response to the receiver being assigned to the first phase and a second set of bit metrics based on the energy values in response to the receiver being assigned to the second

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phase. However, the final Office Action still did not provide any foundation in the reference of the claimed feature. Because no such foundation existed, Applicants requested withdrawal of the rejection.

5 Additionally, Applicants previously asserted Iwamura has no disclosure of any relationship between a GMD decoding apparatus and phase. In the Response to Arguments section, the final Office Action alleged Iwamura teaches bit metrics in GMS decoding. Thus, the Office Action appeared to concede Iwamura has no disclosure of any relationship between a GMD decoding apparatus and phase.

10 Furthermore, Applicants asserted the Office Action did not provide proper motivation for combining the references. Unfortunately, the final Office Action still did not provide proper motivation for combining the references. In particular, the final Office Action only cited sections of each reference that discuss the operation of the references. However, the final Office Action did not provide any basis for actually combining the references. The final Office Action only made a conclusory remark of: "The motivation and benefit are obvious."  
15 However, this is not a proper basis for motivation. In particular, there must be some suggestion or motivation, either in the reference or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings (MPEP 2142). The allegations of the final Office Action only amounted to a circular allegation of the combination being obvious because it is obvious. In fact, the final Office  
20 Action did not even attempt to address Applicants' specific assertions of the lack of motivation. Thus, the final Office Action still did not provide proper motivation for combining the references.

The Advisory Action appears to admit the deficiencies of the previous Office Actions because it introduced new interpretations of the cited references. In particular, the Advisory  
25 Action alleged new, elaborate interpretations of two different embodiments of Yamao et al. in an attempt to fix the deficiencies of the previous Office Actions. Unfortunately, Applicants were not provided the opportunity to respond to these new interpretations during normal prosecution. Furthermore, the interpretations are so convoluted, Applicants assert they do not remedy the deficiencies of the previous Office Actions.

30 In particular, among other deficiencies, the new interpretations still do not disclose generating a first set of bit metrics based on the energy values in response to a receiver being assigned a first phase. For example, the Advisory Action alleges "the output of the decoder 4-1 is a bit metrics wherein the (a1, a2) is the bit metrics." However, this is not taught by

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Yamao et al. More particularly, Yamao et al. only states "The four sequences of 2 bits data outputted from the M-ary decoders 4-1 to 4-4 are then recomposed into the original 8 bits data (i) (at a point (i) indicated in Fig. 11) by the composition unit 8 using the inverse operations of what was applied at the transmitting side." Yamao et al. does not state that it generates a first set of bit metrics based on the energy values in response to a receiver being assigned a first phase.

Additionally, the Advisory Action appears to concede that Yamao et al. does not state that it generates a first set of bit metrics based on the energy values in response to a receiver being assigned a first phase because the Advisory Action goes on to allege "it is well known in the art that the first and second sets of sequence from the energy values of the envelop detector (as shown in Fig. 14) can be represented by bit metrics in math form." Unfortunately, this allegation is improper for at least two reasons. First, it is a new grounds of rejection that was not introduced in any previous Office Action, and Applicants have not been given the opportunity to traverse this allegation of what was well known. Thus, Applicants traverse this allegation in accordance with MPEP §2144.04. Second, the fact that first and second sets of sequence can be represented by bit metrics does provide motivation for doing so. Therefore, the allegation of "it is well known in the art that the first and second sets of sequence from the energy values of the envelop detector (as shown in Fig. 14) can be represented by bit metrics in math form" is improper.

Accordingly, neither Yamao et al. nor Iwamura disclose a means for generating a first set of bit metrics based on the energy values in response to the receiver being assigned to the first phase and a second set of bit metrics based on the energy values in response to the receiver being assigned to the second phase and means for designating the least reliable bits in the received word based on one of the first and second sets of bit metrics, as recited in independent claim 25. Furthermore, none of the Office Actions have provided proper motivation to combine the references.

Based on the foregoing, Applicants respectfully submit independent claims 1, 13, and 25 are allowable. The remaining claims depend from the allowable independent claims and are therefore also allowable. Accordingly, kindly reverse and vacate the rejection of claims 1-25 under 35 U.S.C. § 103, with instructions for the Examiner to allow claims 1-25.

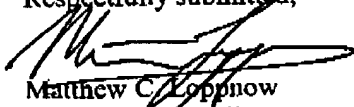
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### CONCLUSION

In view of the discussion above, the claims of the present application are in condition  
for allowance. Kindly withdraw any rejections and objections and allow this application to  
5 issue as a United States Patent without further delay.

The Commissioner is hereby authorized to deduct the amount of \$340 for filing a brief  
in support of an appeal and any fees arising as a result of this Appeal Brief or any other  
communication from or to credit any overpayments to Deposit Account No. 50-2117.

Respectfully submitted,

  
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## IX. APPENDIX

Claims involved in the appeal:

- 5           1.       (original) A receiver, comprising:
- a detector adapted to demodulate a received signal to generate a received word, the received word including a plurality of symbols, each symbol containing data associated with a first phase and data associated with a second phase, the detector being further adapted to generate a plurality of energy values relating each received symbol to one of a plurality of
- 10       potential symbols; and
- a decoder adapted to generate a first set of bit metrics based on the energy values in response to the receiver being assigned to the first phase and a second set of bit metrics based on the energy values in response to the receiver being assigned to the second phase, the decoder being further adapted to identify the least reliable bits in the received word
- 15       based on one of the first and second sets of bit metrics.
2.       (original) The receiver of claim 1, wherein the decoder is further adapted to generate a plurality of candidate codewords based on the received word and the least reliable bits.
- 20       3.       (original) The receiver of claim 2, wherein the decoder is adapted to generate a word metric comprising the sum of the bit metrics in one of the first and second sets for each of the candidate codewords.
- 25       4.       (original) The receiver of claim 3, wherein the decoder is adapted to identify the candidate codeword having the greatest bit metric as a received codeword.

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5. (original) The receiver of claim 1, wherein the detector comprises an envelope detector including a plurality of filters, each filter being adapted to generate a soft symbol energy associated with one of the potential symbols.

5

6. (original) The receiver of claim 5, wherein a first subset of the potential symbols correspond to a binary 1 for the first phase and a second subset of the symbols correspond to a binary zero for the first phase, and the decoder is adapted to select the soft symbol energy in each of the first and second subsets closest to an upper bound energy threshold to generate the first set of bit metrics.

10

7. (original) The receiver of claim 6, wherein a third subset of the potential symbols correspond to a binary 1 for the second phase and a fourth subset of the symbols correspond to a binary zero for the second phase, and the decoder is adapted to select the soft symbol energy in each of the second and third subsets closest to an upper bound energy threshold to generate the second set of bit metrics.

15

8. (original) The receiver of claim 1, wherein the detector comprises a discriminator detector adapted to generate an output energy, and the decoder is adapted to compare the output energy to a plurality of potential symbol energy thresholds to generate soft energies associated with the potential symbols values.

20

9. (original) The receiver of claim 8, wherein the decoder is adapted to clip the soft energy values at a maximum value.

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10. (original) The receiver of claim 8, wherein the decoder is adapted to generate a channel attenuation estimate for each received symbol and generate one of the first and second sets of bit metrics based on the channel attenuation estimate.

5 11. (original) The receiver of claim 8, wherein a first subset of the potential symbols correspond to a binary 1 for the first phase and a second subset of the symbols correspond to a binary zero for the first phase, and the decoder is adapted to select the soft symbol energy in each of the first and second subsets closest to the associated potential symbol energy threshold to generate the first set of bit metrics.

10 12. (original) The receiver of claim 9, wherein a third subset of the potential symbols correspond to a binary 1 for the second phase and a fourth subset of the symbols correspond to a binary zero for the second phase, and the decoder is adapted to select the soft symbol energy in each of the second and third subsets closest to the associated potential symbol energy threshold to generate the second set of bit metrics.

15 13. (original) A method for assigning bit metrics for algebraic decoding in a receiver, comprising:

demodulating a received signal to generate a received word, the received word  
20 including a plurality of symbols, each symbol containing data associated with a first phase and data associated with a second phase;

generating a plurality of energy values relating each received symbol to one of a plurality of potential symbols;

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generating a first set of bit metrics based on the energy values in response to the receiver being assigned to the first phase and a second set of bit metrics based on the energy values in response to the receiver being assigned to the second phase; and  
designating the least reliable bits in the received word based on one of the first  
5 and second sets of bit metrics.

14. (original) The method of claim 13, further comprising generating a plurality of candidate codewords based on the received word and the least reliable bits.

10 15. (original) The method of claim 14, further comprising generating a word metric comprising the sum of the bit metrics in one of the first and second sets for each of the candidate codewords.

16. (original) The method of claim 15, further comprising designating the  
15 candidate codeword having the greatest bit metric as a received codeword.

17. (original) The method of claim 13, further comprising generating a soft symbol energy associated with each of the potential symbols.

20 18. (original) The method of claim 17, wherein a first subset of the potential symbols correspond to a binary 1 for the first phase and a second subset of the symbols correspond to a binary zero for the first phase, and the method further comprises selecting the soft symbol energy in each of the first and second subsets closest to an upper bound energy threshold to generate the first set of bit metrics.

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19. (original) The method of claim 18, wherein a third subset of the potential symbols correspond to a binary 1 for the second phase and a fourth subset of the symbols correspond to a binary zero for the second phase, and the method further comprises selecting the soft symbol energy in each of the second and third subsets closest to an upper bound energy threshold to generate the second set of bit metrics.

20. (original) The method of claim 13, further comprising:  
generating an output energy associated with each of the received symbols; and  
comparing the output energy to a plurality of potential symbol energy thresholds to generate soft energies associated with the potential symbols values.

21. (original) The method of claim 20, further comprising clipping the soft energy values at a maximum value.

22. (original) The method of claim 20, further comprising:  
generating a channel attenuation estimate for each received symbol; and  
generating one of the first and second sets of bit metrics based on the channel attenuation estimate.

23. (original) The method of claim 20, wherein a first subset of the potential symbols correspond to a binary 1 for the first phase and a second subset of the symbols correspond to a binary zero for the first phase, and the method further comprises selecting the soft symbol energy in each of the first and second subsets closest to the associated potential symbol energy threshold to generate the first set of bit metrics.

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24. (original) The method of claim 21, wherein a third subset of the potential symbols correspond to a binary 1 for the second phase and a fourth subset of the symbols correspond to a binary zero for the second phase, and the method further comprises selecting the soft symbol energy in each of the second and third subsets closest to the associated potential symbol energy threshold to generate the second set of bit metrics.

25. (original) A receiver, comprising:  
means for demodulating a received signal to generate a received word, the received word including a plurality of symbols, each symbol containing data associated with a first phase and data associated with a second phase;  
means for generating a plurality of energy values relating each received symbol to one of a plurality of potential symbols;  
means for generating a first set of bit metrics based on the energy values in response to the receiver being assigned to the first phase and a second set of bit metrics based on the energy values in response to the receiver being assigned to the second phase; and  
means for designating the least reliable bits in the received word based on one of the first and second sets of bit metrics.